

to approach the furnace after the ladle was removed, and it was not, therefore, possible to take the tests from the furnace, one cannot reject as groundless the assumption that the extensive removal of the substances Si, Mn and P was already completed much earlier, and that it appears to be much more certain that this removal resulted momentarily, and only required as much time as was necessary to bring the reagents into necessarily intimate contact with one another.

If one regards their behaviour in this manner, new points of view are given rise to which render possible further chains of reasoning.

(e.) IRON OXIDE DEMAND AND CHARGE—SHRINKAGE IN THE PRODUCTION OF STEEL FROM MOLTEN IRON.

If the elimination of the substances Si, P and Mn from the molten charge, by means of iron oxide, can occur in a moment, it is evidently possible by this means to remove the substances named from the oxidising action of the furnace gases, so that carbon remains as the sole reducing agent in the iron which opposes itself to the latter. If one takes care to have the presence of large amounts of carbon in the charge, one is still able to use up from the products of elimination of silicon and phosphorus, i.e., the iron silicate and iron phosphate, the oxygen content of those amounts of the iron protoxide therein contained which, under the influence of the lime, go over into the free state, in so far as they are not demanded for the existence of the slag.

Carbon present to some excess must be removed by further additions of iron oxide, for the prevention of an excessive lengthening of the process. If one proceeds in the manner assumed, and selects therefore the quantity of the oxide additions in such wise that they cover the entire iron protoxide, requirements of the slag, there results a simplification in the calculation of the oxygen required, as well as for the variation which the weight of metal must undergo, by simply allocating to the oxidising action of the flame the combustion of a portion of the carbon content.

It thus admits of ascertaining the oxide required for each